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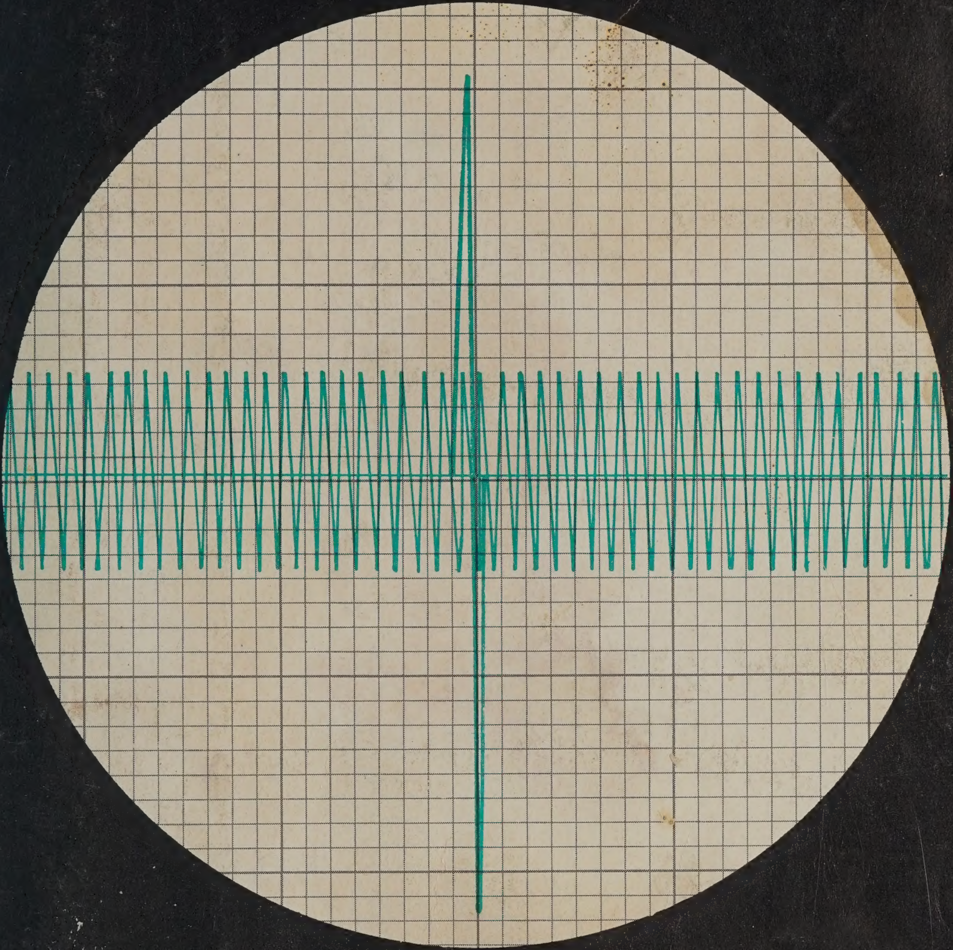
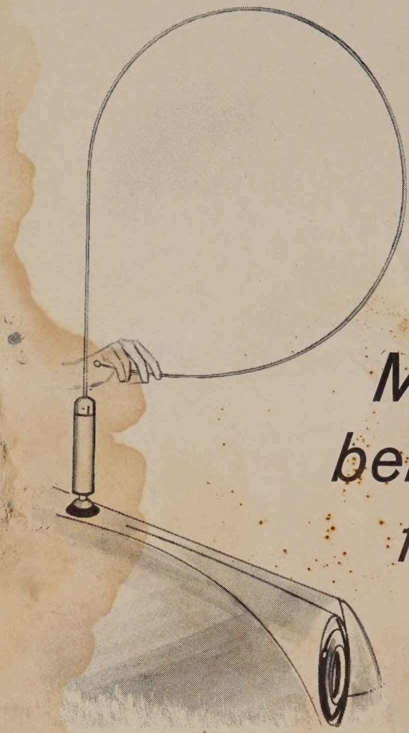


THE PROFESSIONAL COMMUNICATIONS MAGAZINE

About Noise Blankers

— Page 4



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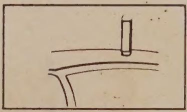

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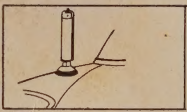

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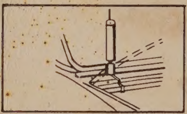

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SPLATTER

Editorial Notes from
Communication Horizons Editor
Robert B. Cooper, Jr., K6EDX

Exciting things are happening in the two-way communications industry these days. The FCC staff is back on the bandwagon with a proposal to execute licensing fees on all non-commercial users of two-way radio (see separate story by Robert E. Tall, this issue); a new docket proposes further channel splitting in the 25-42 megacycle region, and the Conelrad bug-a-boo is up for grabs once again.

A special kind of excitement has been generated in the *Communication Horizons* niche of the office at HP of late, and for the time being, at least, it is overshadowing (locally) many of the events from outside our office.

After nearly a year of operation, *Communication Horizons* has its own full-time editor and a brand new outlook on the potentials of the two-way radio industry.

Late in February, writer-author and electronic whiz Jim Kyle joined the HP staff as the new Managing Editor for CH. We feel this signifies the advances CH has made into the field of two-way communications for a number of reasons. While Kyle is generally recognized as one of the most brilliant of the young crop of writers appearing in electronic journals around, his erudite manner of expression comes through best when he writes of matters affecting communications . . . two-way communications in particular.

New editor Kyle is working feverishly to bring a new expanded "technician look" to CH with a series of maintenance and installation articles that are sure to take CH out of the management area into the workshops. Of course the same up-to-date management material coverage will continue.

Kyle comes well recommended, having left his position as Chief Technical Editor for the RW Division of Thompson Ramo Wooldridge, Inc., Los Angeles to join HP. Jim's by-line has appeared atop features in *Mechanix Illustrated, Collier's, Electronics World, Radio-Electronics, CQ,* 73, *Popular Electronics, CB Horizons and Television Horizons.*

With a writer of such calibre now heading up the CH staff, the much promised new and larger *Communication Horizons* is one step closer to reality.

When you have a problem, or an idea for an article, make it a point to drop Jim a line. He's available six days per week to help you get more use and usefulness from your two-way radio interest.

RBC

APRIL, 1962
Volume 2 ● Number 4

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and **"Two-Way Radio Digest"**

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Noise Blankers

. . . a positive approach

By J. A. McCormick

General Electric Communication Products Department
Lynchburg, Virginia

The end product of a mobile radio system is the sound that comes from the loudspeaker. That sound is a great deal more palatable now that receivers are available with well-designed noise blankers. In fact, fringe area reception becomes usable where once it was completely torn up and rendered unintelligible by ignition noise and other forms of impulse noise. The good service area of a mobile radio system can be extended substantially by the use of receivers equipped with well-designed noise blankers and driver annoyance and fatigue will be minimized throughout the service area.

Let's consider first the nature of ignition noise and its effect upon a receiver. Figure 1 shows a combination of ignition noise impulses and an FM signal as applied to a radio receiver. Note that the pulses may be of much greater amplitude than the desired signal but of a very short duration—one microsecond or so. If they did not last longer than a microsecond they would not sound so objectionable at the loudspeaker. Unfortunately, the pulses are "stretched" in passing through the tuned circuits of the receiver with the result that the length of each disturbance may be increased from one microsecond to as much as 300 microseconds as heard at the loudspeaker. At normal highway speeds, ignition noise pulses occur so rapidly that they sound like continuous noise.

What causes pulse stretching? A tuned circuit may be compared to a mechanical device, —a bell. When a bell is dealt a sharp blow, it will continue to ring for a period of time. A tuning fork is another mechanical example of ringing. So it is with a *tuned circuit.* When it is "struck" with a pulse of energy it is shock-excited into oscillations which die out after a definite period of time. Being resonant devices, tuned circuits both store and give up energy. A number of oscillations are required before the energy is dissipated. Each tuned circuit in the receiver makes some contribution to the time required to accept and transmit a sudden burst of energy, therefore, after having traversed all of the selective circuits of a receiver, the wave-train may be stretched out to several hundred microseconds.

In carefully designed receivers, the transient response of the selective circuits is designed to minimize the pulse stretching which will occur. Noise output may also be produced at the discriminator as a result of frequency shifts due to tuned circuits whose phase responses are not flat and whose amplitude response is not symmetrical.

Is ignition noise a problem to you? If you have any mobile units at all, you know that it is at the limits of your range. In this paper prepared especially for Communications Horizons by General Electric's J. A. McCormick, the three approaches to the ignition noise problem are analyzed in depth. Even if your receivers are of other makes, you'll find the reasoning interesting and informative—and you may find out why sometimes the noise blanker seems not to be working!

General Electric receivers are designed carefully for minimum pulse stretching and are phase tuned to provide minimum frequency variations within the stretched pulse. Special attention has been paid to symmetry and proper loading for least degradation of the desired signal at the output. Unfortunately, some degree of ringing will occur in even the most carefully designed receiver, therefore, a positive approach to the problem is to blank out the ignition noise pulses at some point in the receiver ahead of the loudspeaker.

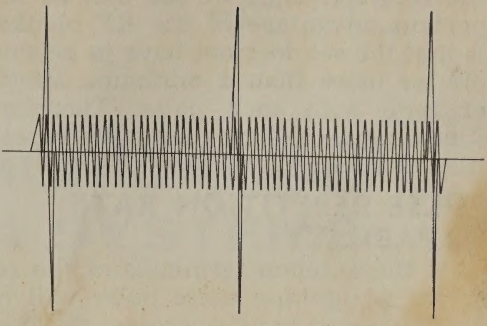


Figure 1

The principle of operation of all noise blankers is the same. At some point in the set the noise pulses are amplified and detected and again amplified by the blanker which turns the set off at some later point in the receiver at the right time, and for the proper duration, to eliminate the pulse. We might say that the blanker is designed to cause the pulses to "commit suicide" before they can reach the loudspeaker.

Figure 2 shows a block diagram of a typical double-conversion superheterodyne receiver. The three places into which an ignition noise blanker could logically be designed, are indicated,—around the RF amplifier, around the high IF amplifier and around the low IF/audio circuitry. As might be expected, there are advantages and disadvantages to each of these three approaches.

Directly below each type of blanker is a representation of the ignition pulse energy bracketed by the blanking period. Note that the receiver must be blanked for a longer period in the case of the *audio* blanker because the pulse has been stretched in its passage through the many tuned circuits of

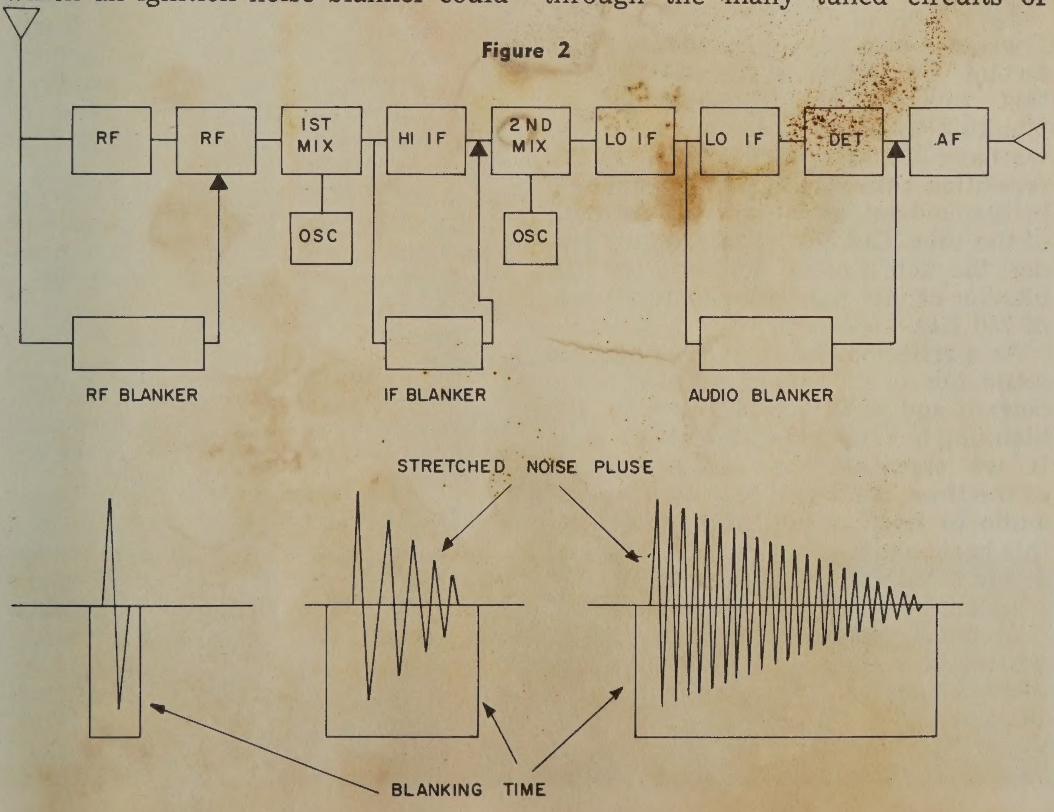


Figure 2

the receiver. Thus we see that an important advantage of the *RF* blanker is that the set does not have to be shut off for more than a minimum length of time with each pulse. Therefore it can handle the greatest pulse repetition rate.

PULSE REPETITION RATE CAPABILITY

At the antenna terminals of the receiver an ignition noise pulse will be about one and a half microseconds long. At the high IF, after passing through RF tuned circuits, it will be about 30 microseconds long and finally in the low-IF amplifier, the duration will approximate 300 microseconds. In each case the blanking time has to be somewhat longer than the pulse length. Therefore, for RF blanking, the blanking duration would be about four microseconds; for high IF blanking, about 40 microseconds; and for AF blanking about 400 microseconds. Now the question is: How many pulses per second can be handled by each type of blanker, or to put another way, what is the permissible repetition rate?

Let's look at the RF blanker first. There are a million microseconds in a second. By simple arithmetic, we see that dividing the four-microsecond blanking-time-per-pulse into a million we have 250,000 cps or 250 KC as the repetition rate at which the set would be blanked out, or shut off, 100 per cent of the time. Obviously, this would render the set useless, so even the RF blanker cannot handle a repetition rate of 250 KC.

As a criterion, we might say that we could tolerate a loss of 3 db of audio output and this would occur if the blanking took up 50 percent of the time. If we shut off the audio for half of the time, we would lose only 3 db of audio or half of the total power. On this basis we see that we could handle a repetition rate of half of 250 KC or 125 KC.

In the case of the high-IF blanker, where the set is shut off for 40 microseconds per ignition noise pulse, our 100 percent shut-off time, again by simple arithmetic, would be 25,000 cps or 25 KC. For a 3 db loss in audio (which would occur if the set were shut off half the time) we could handle a repetition rate of 12,500 cps or 12.5 KC with the high IF type of blanker. And finally, looking at the low-IF/audio blanker, we could handle a repetition rate of 2,500 cps for total cut-off or 1,250 cps for a 3 db loss in audio output.

How high a repetition rate must we be able to handle? At 60 miles an hour, an 8-cylinder automobile will have an ignition firing rate of approximately 200 per second, therefore, the repetition rate of 1250 cps for the audio blanker would seem adequate. Unfortunately, our receiver is vulnerable to the ignition noise radiated by other vehicles in the vicinity as well as noise from many other potential sources.

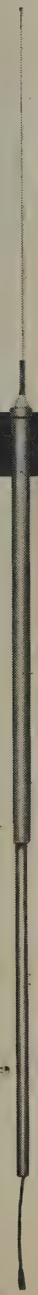
In addition, we are vulnerable to beat notes produced by the intermodulation of two or more interfering signals and these beat notes can be greatly in excess of the 1250 cps. Since the blanker does not recognize any difference between noise impulses and high frequency beat notes, we see that there is no such thing as too high a repetition-rate-handling capability. On this basis the RF type of noise blanker is clearly superior to IF and audio type blankers. The receiver is shut off or blanked out for the absolute minimum of time for each impulse of noise or cycle of beat note interference.

Let us now compare the three types of blankers on the other important parameters of susceptibility to interference, operator skill required, complexity, and cost.

Obviously, the IF and AF noise blankers take advantage of the gain and selectivity of the standard receiver circuits. Therefore, they do not require as many stages of amplification as are necessary in an RF type blanker.

AUDIO BLANKER

In an experimental audio blanker applied to a General Electric Progress Line receiver, noise pulses are taken after the first 6-coil low-IF transformer. The normal selectivity of the receiver eliminates any possibility of adjacent channel or off-frequency interference to the blanker operation. Conversely, the addition of the blanker



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Electrical:

Nominal input impedance	50 ohms
Maximum power input	500 watts
Omnidirectional gain	3 db
Internal feedline	RG-8A/U
Flexible terminal extension	18″ of RG-8A/U
Termination	Type N male with Neoprene housing
VSWR	1.5:1
Bandwidth	±1%
Lightning protection	Star gap

Mechanical:

Skirt	2″ dia. red brass
Whip rod	6061-T6 aluminum
Support pipe	1-5/16″ dia. hot-galvanized steel, 24″ minimum length exposed available for mounting
Rated wind velocity	100 MPH at 150 Mc
Lateral thrust at rated wind	19 lbs. at 150 Mc
Bending moment 6″ below skirt	55 lbs. at 150 Mc
Weight	30 lbs. at 150 Mc

**Exact frequency must be specified*

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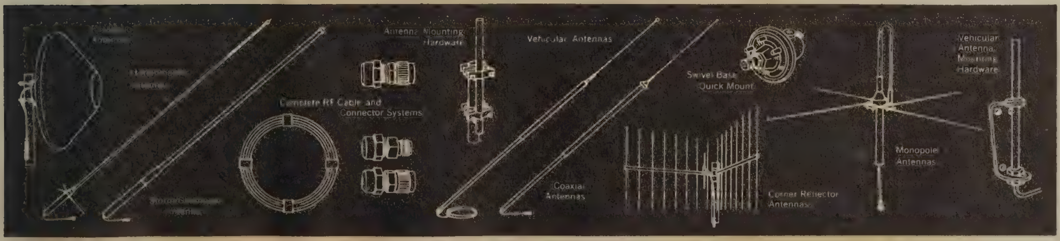
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cannot adversely affect the normal performance of the receiver and it is never necessary to turn off the blanker to prevent degradation of the normal receiver performance. The blanker may be permitted to operate all the time.

The signal and impulse noise are coupled to an IF amplifier on the blanker chassis through an RC network. The amplifier impulses and signal are detected and applied to a pulse amplifier, while a DC bias derived from the signal is applied at the same point to control the threshold. This minimizes the effect of the signal on the blanker while allowing the impulses to be amplified.

The pulses are amplified and shaped in a two-stage amplifier and applied to the base of a silicon transistor switch. Each pulse drives the transistor into conduction, thus shorting the audio output of the discriminator to ground for the duration of the interfering pulse. At very high signal levels the automatic threshold disables the blanker since its function is no longer required.

The normal gain of the receiver creates large impulse voltages at the limiter so that very little amplification is needed to provide the cut-off signal for the audio amplifier. No special provisions need be taken to synchronize the noise pulses with the blanking. The audio blanker described is capable of very good results so long as the impulse repetition rate is low. However, at high repetition rates the distortion of received audio is certainly a limiting aspect of audio noise blankers.

IF BLANKER

In the IF type noise blanker, noise voltages are normally taken from a location before or between the selective elements of the high-IF amplifier and the blanking is done after the selectivity. This means that more amplification is required than in the case of the audio blanker and the relatively wide bandwidth of the selectivity at the first mixer allows intermodulation and adjacent channel signals to appear along with the noise in the blanker amplifier channel.

Blanking pulse widths at high IF are about 1/10 those required for the audio blanker so, as mentioned above, complete cut-off of the receiver for the 40-microsecond blank would occur at a 25 KC repetition rate.

It is easily possible for two or more strong, interfering signals to produce an intermodulation product of 25 KC or even higher, thus blanking the receiver completely to any desired signal, *no matter how strong the desired signal may be.*

With the IF blanker, therefore, a switch must be provided to turn off the blanker under conditions of interference. Another reason for a control switch is the fact that the IF blanker is also vulnerable to strong adjacent or near channel interference. Such a signal is "chopped up" or modulated at the ignition pulse rate due to normal operation of the blanker and this process produces energy up and down the spectrum. Some of it will fall on the channel to which the receiver is tuned. In effect, the ignition noise pulses are regenerated, so that the set now sounds like it has as much or more ignition noise than a set without a blanker. Except for these two types of interference, an IF blanker can cope with most impulse noise even at a fairly high repetition rate without noticeable audio distortion.

RF BLANKER

In the RF blanker, noise pulses are taken directly from the antenna terminals. Therefore, a two or three-stage RF amplifier is required in the blanker channel for the required gain. Since the blanking pulse must be synchronized with each pulse of noise, suitable delay must occur in the signal RF amplifier of the receiver. In receivers with high RF selectivity, the normal tuned circuits will provide the necessary delay. For receivers with little RF selectivity, a delay line can be added.

Figure 3 is a block diagram of an RF blanker incorporated in a General Electric Low Band receiver. The blanker channel is tuned to a frequency about 3 MC above the signal channel. Signal and noise are separated right at the input to the receiver — an

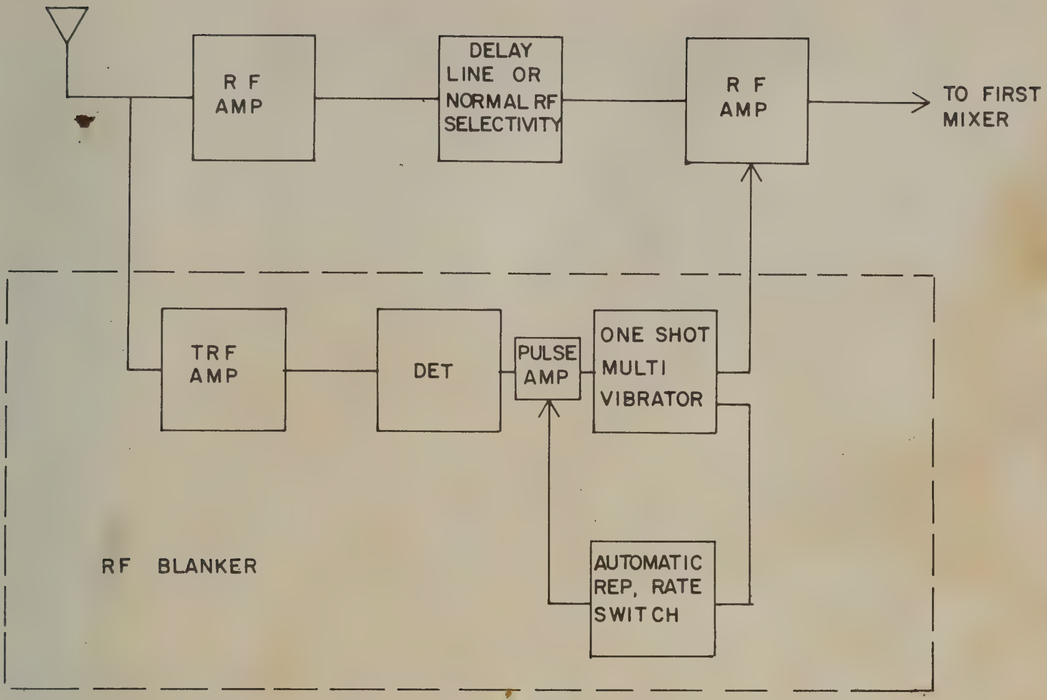


Figure 3

important advantage over IF & RF blankers.

The blanker is a high gain, broadband amplifier with a gain of over 100 db. The relatively broad pass-band (1 MC band-width at the 6 db points) is required in order to accommodate the sharp rise-time characteristic of ignition noise pulses.

After amplification, the pulses are detected, amplified, and used to trigger a one-shot multi-vibrator which is arranged to blank the receiver for an approximate four microseconds for each input pulse.

With such an extremely short blanking interval, impulse noise of very high repetition rates can be handled without any noticeable effect on the receiver output. There is no noticeable loss of audio power or increase in distortion. For this reason the RF blanker performs the blanking function very much more effectively than IF or audio type blankers.

Unfortunately, because of the broadband, parallel RF amplifier in the blanker channel, it is the most vulnerable to interference. For this reason, some means must be provided to switch off the blanker under conditions of interference.

Everything is fine so long as nothing more than impulse noise is fed to the blanker amplifier. However, when two or more strong, interfering signals appear in the blanker channel, a beat note is generated which can deteriorate reception or completely turn off the receiver. For example, if there are two signals in the blanker channel with a spacing of 125 KC, the 125 KC beat note between the two will appear in the blanking channel and will operate the blanking function at that rate. This would turn off the receiver 50 percent of the time. If the beat frequency happened to be 250 KC, the receiver would turn off all of the time and render the receiver useless for the reception of a desired signal, during the times such interference prevailed.

Inasmuch as receivers with RF blankers are quite vulnerable to interference, particularly in today's crowded radio spectrum, it is mandatory that some means be provided by which the blanker can be turned off during periods of interference. This could be in the form of an "on-off" switch manually operated by the user. Unfortunately, even a radio engineer would have difficulty in deciding if and when the blanker should be switched off.

In the presence of IM interference, the set will remain completely silent to any desired signal because the blanker will have it completely shut off and the operator cannot be aware of this situation unless there is an intermittent break in the interference. His own station could be on the air at such a time without his even being aware of it. He therefore has the possibility of not being aware of the interference or of knowing that his station is transmitting. Bear in mind that the blanking, under IM interference conditions, shuts the set off regardless of how strong the desired signal may be. This then becomes a new form of degradation to which we have never before been accustomed in mobile radio receivers.

The obvious answer to this problem of when to use and when *not* to use the blanker is the more sophisticated method of an automatic electronic switch which operates on the basis of the pulse repetition rate occurring at any particular period of time.

Whenever intermodulation interference is occurring at a frequency beyond, say, 20,000 cps the blanking pulses may be integrated to provide a bias voltage to cut off the blanking function. During such times, ignition noise will be heard as though the set had no blanker, however, any desired signal present will still be as readable as a set without a blanker. Then when the interference ceases, the blanker reverts to its normal operation of quieting the desired signal.

Figure 3 shows the automatic rep-rate switch as it is incorporated in the GE RF-noise-blanker-equipped receivers. As the rep-rate rises to the danger point, this electronic switch shuts off the pulse amplifier between the detector and the one-shot multivibrator so that the blanking function ceases under such conditions automatically and without any attention whatsoever from the operator. The automatic rep-rate switch is an exclusive feature of General Electric noise blankers.

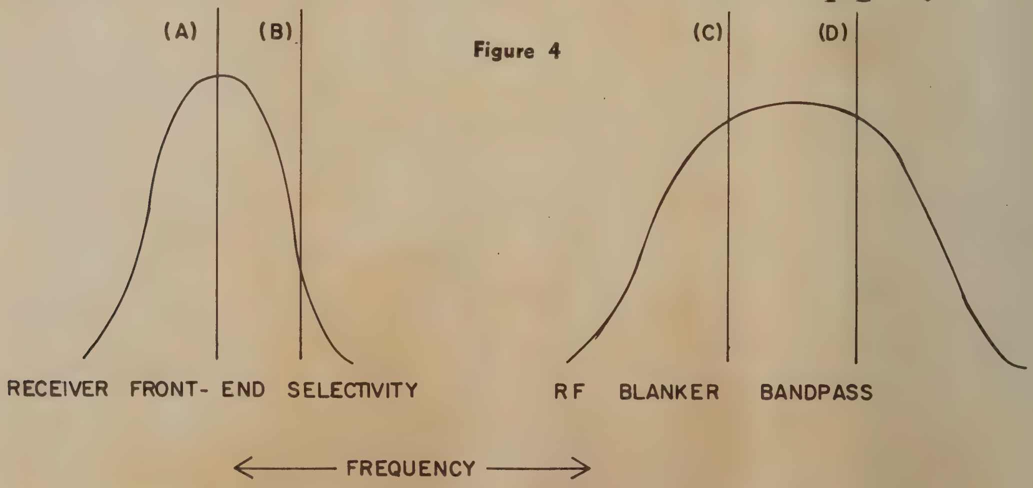
Figure 4 shows graphically the two types of interference to which RF blankers are vulnerable.

CONCLUSION

1. Audio blankers are free of interference problems and may therefore operate all of the time. However, they are not considered adequate for the mobile service be-

(Continued on page 14)

Figure 4



(A) ON-CHANNEL SIGNAL.
(B) NEAR-CHANNEL SIGNAL.
(C)&(D) INTERMODULATION PRODUCING SIGNAL IN BLANKER.

Should Peter Pay Paul?

Vermont Hints Counterattack on Filing Fee Plan

by Robert E. Tall
Chief, CH Washington Bureau

A surprise "turn about" approach of state governments charging federal bureaus for services rendered marked the first reaction to the FCC's latest "filing fee" proposal—an idea which has been on and off for more than 10 years.

The issue was raised again this month when the commissioners voted (4-3) to adopt a proposed schedule of fees for licensing and some other services, and called for comments on the plan by April 16.

Col. William H. Baumann, Vermont's commissioner of public safety and state director of civil defense, advised the commission that his office—at the request of Vermont's Gov. Keyser—was studying the amount of services now furnished to federal agencies by the state.

"The charges for these services to the federal government might exceed those you contemplate making to the state," Col. Baumann declared.

Preliminary estimates of the relicensing fees for the state of Vermont, based on the schedule adopted, run as high as $8,000.

A Texas state official also went on record in opposition to the filing fee plan. James H. Garner, state coordinator of the Texas division of defense and disaster relief, said such a plan would "seriously hinder and disrupt, if not entirely destroy," the disaster communications networks composed of state systems and cooperating ham operators.

In addition, Garner said, the plan would be in effect a federal tax of state and local governments.

Garner, speaking for the Texas executive department, said, "Should it be concluded that the Commission must adopt some form of this proposal, then we feel that those services which exist for reasons other than financial gain should be excluded from it."

The immediate responses to the FCC proposal — more than a month in advance of the deadline—indicate that comments received will be many and violent. The Commission, in adopting the proposal, specifically requested comment on applicability of the fee plan to non-profit radio enterprises.

The fee plan adopted by the Commission differs substantially from the draft schedule considered last summer. Changes made, however, are primarily of benefit to the broadcast industry.

The plan is in line with a Budget Bureau directive issued several years ago to "effectuate Government policy that the recipients of special benefits" should pay a "reasonable" charge.

Filing fees, under the plan adopted, would be payable at the time of filing and would not be refunded even if the application were refused.

Highest fee — $250 — would apply to applications for TV commercial stations, major changes, renewals, assignment of license, and transfers of control, as well as to cable land license applications.

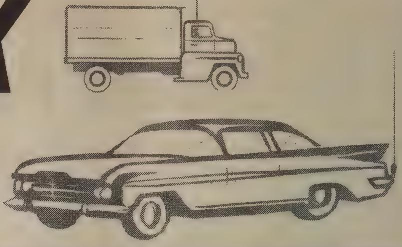
Next highest fee, $150, would be charged for AM and FM commercial stations, major changes, renewals, assignment of license, and transfers of control. This fee would also be charged for applications for additional transmitters in the international fixed public service, and for domestic public land mobile initial construction permit applications, including mobile units.

This equating of the domestic public land (common carrier) mobile radio system with AM and FM commercial stations is almost certain to draw heavy comment under the "fair and equitable assessment" factor of the proposal.

Of great interest to us is the section dealing with Safety and Special serv-

(Continued on page 14)

SHOP TALK



By I. Kay Redd, Jr.

A favorite topic of discussion among service men is contract service versus job service. This is probably because the service shop owner feels that he is not making enough money and suspects that the reason is that he does not have enough customers on contract or that he is not charging enough for the ones that are on contract. Or maybe if he charged less, he could get more customers on contract, and still make more money. In any case, I think most service shop owners agree that all customers should be on contract.

There is no question that contract service will result in a much smoother operation from the standpoint of both the service shop and the customer. A radio system should be serviced *as a system* and this can only be done satisfactorily if the service man is free to service any portion of the system which may need attention, without additional cost to the customer.

Ten or fifteen years ago it was considered routine for all customers to put their radios on a flat rate service contract. But then, so did most television set owners. That was in the old days when TV and two-way radios were both new and mysterious to the owners; they bought a contract because of fear, fear that this intricate machine that had cost so much money to buy might otherwise keep them broke with repairs.

But by 1957, most two-way radio systems were large: police, taxi, road builders, etc. For these large systems, a service contract was convenient and economical. The radio equipment is most essential to their business and the equipment is used in rough service at least eight hours a day.

Today there are even more large systems and the service contract is just as beneficial as ever, but what about all the hundreds of small business radio systems going on the air now? Many have only a base and one or two mobiles. They too need service.

Maybe you can figure out some way to predict how much use a radio will get from a plumber, roofer, garbage collector or taxidermist and thereby base logical service rates, but I doubt it. It is hard enough to determine how much to charge the big companies. Usually contract rates are merely based on what other shops have been charging, or what the traffic will bear.

Contrary to what most service shop owners want, I believe it should be left up to the customer to select the type of service he wants. If he wants

Here we're introducing I. Kay Redd, Jr., latest addition to the CH staff of experts bringing you in each issue the best available information in the two-way radio industry. Kay, now president of Mobile Communications, Inc., Silver Spring, Maryland, has been in two-way servicing activities for almost 20 years, in military as well as civilian capacity.

An E. E. graduate of Virginia Polytechnic Institute, Kay's communications career has also included service as Chief Engineer of Broadcast Station WXGI in Richmond, Virginia, which he helped to build.

Mobile Communications, Inc., is a General Electric authorized service station and manufacturers representative for northern Virginia, Washington, D.C., and the surrounding Maryland area.

As servicing editor for CH, Kay will welcome your comments and letters suggesting subjects for future columns.

to pay by the job, he should get just as good service and pay the price, and the price should not be more or less than the equivalent price for the same work under contract. If he wants contract service, it should be available.

The service shop rates should be calculated so that the same rate of profit will be made on either customer. This rate is very difficult to determine because individual statistics usually do not tell the truth. We kept very accurate records of how much each radio serviced by us for a year cost the customer on a job basis. (The average was $50.64 per mobile.) But the fallacy is this: first it includes mobiles which may have been serviced by another shop for the last part of the year, our records would simply show that they had no trouble and no expense during that time. Second, it includes service to radios that get service from whatever shop or "jack-leg" mechanic might be convenient at the time. Therefore the $50.64 figure is definitely too low.

Now assume a service shop has reached the perfect "profit balance." This doesn't mean the customer will average paying the same for contract service as job service. A service shop in Dallas, Texas, analyzed over 15,000 service jobs and found that 30 percent of the service was not equipment repair, but involved such operational matters as interference, noise reduction, preventive maintenance, inspection, and FCC measurements. It could be assumed from this that when radios are maintained on a "call when it quits" basis, the cost would be 30 percent less. To correlate this with our survey, if we charge $6.00 per month per mobile on contract, per job service would average $1.80 less, or $4.20, which is 2 cents a month less than our survey. Interesting, to say the least.

A contract should include preventive maintenance, and all parts and labor necessary to keep the radios in the very top shape. This involves time-consuming record keeping, all of which is expensive and the contract rate will be relatively high. The contract customer might have a tendency to call for more service than might be necessary because it doesn't cost any more, but when the service shop is busy, there is also a tendency for the shop to give less service than the customer is actually paying for.

On the other hand, a per job customer seldom pays for more than he gets. The customer attitude is often to leave the radio alone when it is working all right, and if it stops working, just fix it, don't overhaul it.

When a radio comes in for service, it should not be just "patched up" and sent out. After the defective part is replaced, it should be thoroughly checked (not necessarily overhauled), or else the customer will be back a dozen times for free service. When there are other customers waiting impatiently in line for service, there is a tendency to neglect part of the service, and that is where money is lost.

The job customer and the contract customer both want to get as much for their money as possible, so a well run service shop should see that they do, without giving away free service. I am sure this is possible because people in other types of service businesses are making money without insisting on service contracts.

Another important factor in deciding whether customers should buy a contract or pay for service by the job is the size and location of the service shop.

A small shop in a small town with no competition could insist on all of its customers taking a contract. This would insure the shop a fairly constant income during the year. In a big city, a shop has to cater more to the customer's desires, and whether the customers have a contract or not is pretty much up to the serviceman's selling ability.

If a customer is only paying ten dollars a month to buy a radio it might be difficult to sell him on the idea that he should pay six or eight dollars a month to have it maintained (especially before he has bought the radio).

The progressive service shop that can convince the customer he will have to spend the money for a contract, can provide the customer with a communication service and not a mere repair service.

SERVICE HINT

In equipment designed to operate on 6 or 12 volts, be careful to check the filament balance on 12 volts. Odd troubles can occur when a partial short causes some of the tubes to have 7 volts and the rest to have 5 volts. For example, a shorted 2E26 in the transmitter can cause the receiver squelch not to operate.

FILING FEES—(Continued)

ices, where most applicants would be charged a $20 fee. The same fee would apply to experimental stations.

Other fees are $10 for citizens radio, for rural and domestic public land mobile CPs, for otherwise unlisted common carrier CPs, and for other non-radio applications; and $5 for amateur, RACES, and disaster services.

Commissioners supporting the proposal were Chairman Newton T. Minow, Rosel H. Hyde, Robert E. Lee, and T. A. M. Craven. Opposing were Robert T. Bartley, Frederick W. Ford, and John S. Cross.

NOISE BLANKERS—(Continued)

cause of their low repetition rate handling capability.

2. IF blankers may be considered a compromise approach with their effectiveness lying somewhere between that of an audio and an RF blanker. They are good for medium to high repetition rates, but are subject to intermodulation and adjacent channel interference, therefore some method of switching off is necessary if desired signals are not to be deteriorated.

3. RF blankers clearly are functionally superior to both IF and AF blankers because they can handle the highest repetition rate. Their vulnerability to intermodulation and adjacent channel interference can be obviated by providing an automatic switch which deactivates the blanking function only during those intervals when interference produces prohibitive blanking rates.

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- Masters your vehicle ignition noise!
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- Masters power line noise!
- Masters generator-regulator hash!

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USER NET PRICE $42.50
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Exemption Certificate must accompany order for deduction to apply.
Prices include prepaid surface transportation to Continental U.S.A. destinations.
Applicable State and Local taxes will be additional.

Advise Receiver, Make, Model, 1st I.F. frequency and receiver filament voltage (6 or 12 volt) — specify for base station or mobile unit.

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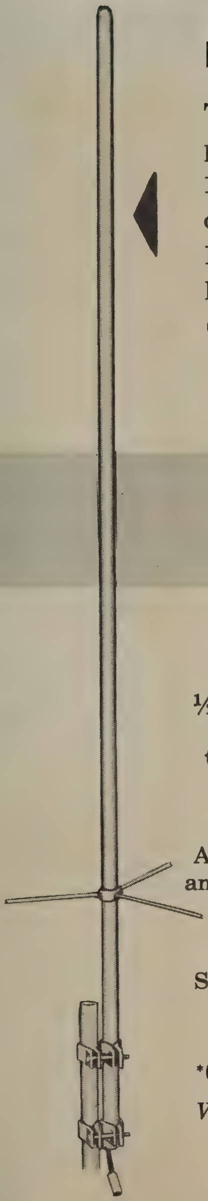
BASE STATION 6 db GAIN



MODEL ASP-298

This Colinear Vertical 6 db gain* antenna provides omnidirectional coverage in the 130 - 174 mc range. Gives 4 times the radiated power of your transmitter and is twice as sensitive in receiving. Heavy duty construction throughout with adequate lightning protection. Write for complete listings in Catalog SD-152. (Base Station Antennas)

*(Reference: Ground Plane Antenna)

MOBILE ROOF TOP ANTENNAS

MODEL ASPR177

½ wave length, high gain, roof top antenna. 130 - 174 MC. 3db gain* doubles transmitting power. Sealed, tamper-proof transformer. 100 watt continuous load.

MODEL ASPR203 Kit to adapt ASPR177 to fit GE and RCA mounting base and convert these models to ½ wave length. 100 watt continuous load.

MODEL ASPR206 Conversion Kit. Same as ASPR203 except converts Motorola TU316 or P-9363 antenna to ½ wave length high gain, 100 watts.

*(Reference: ¼ Wave Length Antenna)

Write for Complete Listings of Communication Antennas in Catalog SD-144.

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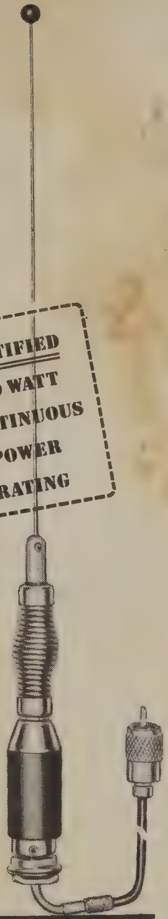
100 WATT
CONTINUOUS
POWER
RATING



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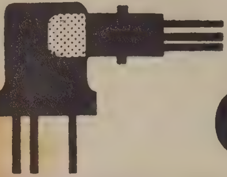
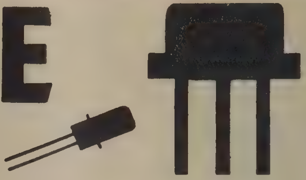
SOLID STATE COMMUNICATIONS





Donald L. Stoner
D. L. Stoner Associates
Alta Loma, California

Most transistor v.h.f. oscillators, whether free running or crystal control, can be evolved into the basic configuration of the Colpitts. Fig. 1 shows the Colpitts circuit without power or bias connections. It is particularly important to note that the two capacitors connected in parallel with the tank form a capacitive voltage divider to provide a match between collector and base impedances. Because the collector will be many times the base impedance, the lower of the two capacitors (between base and emitter) will have the larger value.

The operation of this circuit is nearly identical to the vacuum tube version. Energy in the output circuit (collector) appears across the tuned circuit. Because the junction of the two capacitors is the common point, it is equivalent to a tap placed on the coil. The larger the base capacitor, the closer this "tap" will be to the base end of the coil.

The energy which develops between the "tap" and the collector end of the coil will induce opposite phase energy in the base half of the coil. This energy, or signal, is then amplified by the transistor since it appears across the base-emitter junction of the transistor. The amplified energy then appears again in the collector circuit and the process repeats due to the closed nature of the feedback loop. The circuit will oscillate and continue to do so, until the supply voltage is removed or the feedback loop is broken. The frequency of oscillation will be determined by the resonant frequency of the tuned circuit formed by the two capacitors and the inductance.

The circuit shown in fig. 2 has been used by the writer in several types of telemetering equipment. It can be frequency modulated by applying the modulation voltage to the base. A deviation of 75 kc. can be obtained, with excellent linearity, with only 0.03 volts of modulation. The audio voltage swings the collector junction capacitance, thereby changing the resonant frequency of the tank. For this reason f.m. circuits should have a small C and large L ratio. Unfortunately, this is

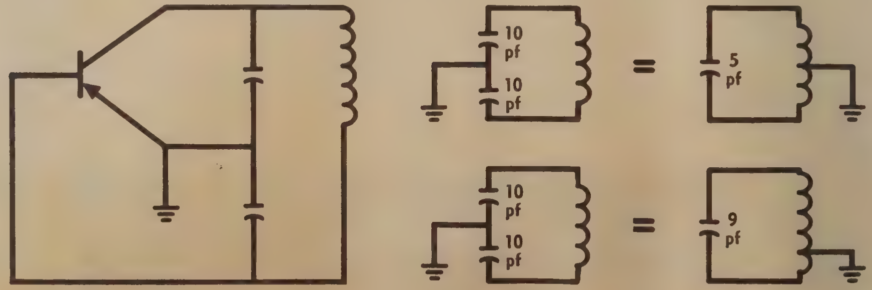


FIGURE 1

counter to the requirements for best stability.

The collector junction capacitance is also very much affected by heat or temperature changes. For tunable local oscillator service the capacitance shunting the collector and emitter junctions should be as large as possible to "swamp out" changes in the device capacitance. Obviously the greater the tuned circuit capacitance contributed by the transistor, the greater will be the instability. To avoid changing the LC ratio, the 5 pf capacitor can be increased in value, leaving the divider capacitors (4.7 and 47 pf) fixed. Naturally the inductance will have to be reduced to maintain a given frequency of oscillation.

The inductance in fig. 2 consists of a five-turn coil on a slug tuned ⅜″ coil form. With the values shown the circuit will oscillate in the 88-108 mc. f.m. band. For the 160 mc. communications band, the divider capacitors should be reduced to 2.2 and 22 pf. respectively, with a 2 pf capacitor shunting the coil. For local oscillator service on 160 mc., the values shown in fig. 2 should be maintained but the inductance should be reduced to two turns on a 5/16″ form.

Virtually any high frequency transistor, germanium or silicon, can be used in the circuit. The individual transistor characteristics will affect the circuit performance noticeably, however. This is particularly true of C ob, the output capacitance. Experiments carried out by the writer were conducted using a Philco MADT type 2N1745.

When using other transistors, it will be necessary to adjust the bias resistance values. These resistors are shown in fig. 2 as 22K and 2.2K. They may be set as follows: Observe the collector current and short the tank circuit to stop oscillation. Adjust the larger resistor (22K) for a collector current which produces 1/3 the maximum transistor dissipation.

The power level will be determined by the value of emitter resistor. As the collector current is increased, to run more power input, more current flows through the emitter resistor. Ohm's Law dictates that more voltage will then develop across this resistor, leaving less for the collector-emitter portion of the transistor. Thus the emitter resistor tends to limit the maximum power output of the oscillator.

The value shown in fig. 2 (470 ohms) is about correct for a local oscillator producing one to three milliwatts of output. For transmitter service, using higher dissipation transistors, the emitter resistor would be reduced to somewhere between 22 and 47 ohms. The value should be adjusted to drop 1/6th to 1/12th the supply voltage, with the former figure providing greater stability but least power output.

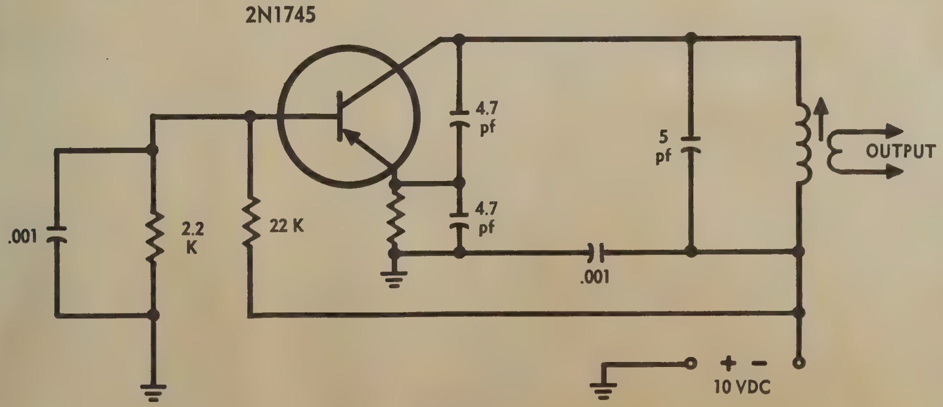
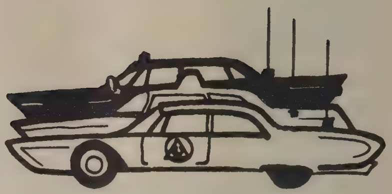


FIGURE 2

PUBLIC SAFETY COMMUNICATIONS



Material Prepared and Submitted by
ROBERT E. BROOKING
Communications Engineer
City of Burbank, California

This month this column is being used for a report by the Chairman of the APCO Public Safety Communications Planning Committee on a Docket recently released by the Federal Communications Commission. This Docket will affect most of the Public Safety licensees below 42 Mc. No editorial comment is given except to call attention to Para. 7 regarding skywave transmission. Much of this interference will be from South American stations speaking Portuguese and Spanish.

Meanwhile a request has been filed by APCO for a sixty-day extension to provide sufficient time for the various Chapters and members of APCO to make known their opinions. After these opinions have been studied, the Planning Committee will prepare appropriate comments for filing with the Commission. Other organizations and licensees are urged to file comments expressing their opinions regarding this Docket.

DOCKET NO. 14503
NOTICE OF PROPOSED RULE MAKING

1. Notice is hereby given of Proposed Rule Making in the above-entitled matter.

2. Previous Commission action in Dockets 11253 and 12169 determined, inter alia, that the creation of channels having a frequency separation of 20 kc/s rather than 40 kc/s was technically feasible. As a result, the appropriate rules of the above-mentioned Parts have been amended to require all equipments used after October 31, 1963, to be of a type capable of permitting operation on channels separated by 20 kc/s.

3. In light of this "channel splitting," it is proposed herein to allocate the frequencies in the 25-42 Mc/s band among the various services referred-to-above, each frequency to have a channel separation of 20 kc/s. This proceeding is substantially responsive to petitions filed by Electronics Industries Association (EIA) and by Special Industrial Radio Service Association, Inc. (SIRSA), RM-201 and RM-306, respectively.

4. The Appendices to this Notice set forth the proposed disposition of the frequencies in this band to the aforementioned Safety and Special Radio Services. The following table summarizes the proposed availability of the primary and split channels to the various services; it does not purport to represent changes in the amount of frequency space allocated to the respective services:

* * * *

5. The proposed allocation is predicated on the evidence now available to the Commission concerning the needs of a particular service for additional frequencies as well as a tentative judgement concerning the priority of need among these services. Within this framework, the proposal generally makes split channels available to the service now occupying that particular part of the band. In some cases, however, in order to avoid interspersion, it was necessary to move portions of one or more services to adjacent frequencies. In the long run it appears more advantageous to create "block allocations" even though some existing systems will be required to change frequencies rather than to intersperse services in order to honor existing allocations.

6. As previously stated, existing licensees in these services (pre-August 1, 1958) operating in the 25-42 Mc/s band utilizing 40F3 equipment are required under present rules to comply with all narrow-band technical standards set forth in the various service rules no later than October 31, 1963. Also, present rules require that new licensees (post-August 1, 1958) must use equipment capable of meeting all these narrow-band technical standards. Thus, in order to facilitate immediate usage of these new "split channels" the Commission is proposing the following:

(a) After the effective date of the final rules in this Docket, no new systems will be authorized unless the frequency requested is in accord with the revised frequency allocation tables.

(b) Licensees authorized prior to the aforementioned effective date will be required to reduce the frequency deviation of all transmitters authorized to operate in this band to plus or minus 5 kc/s within six months thereafter.

7. It should be noted that persons authorized pursuant to Parts 10, 11 and 16 to operate radio stations on frequencies in the band 25-50 Mc/s must recognize that the band is shared with various services in other countries; that harmful interference may be caused by tropospheric and ionospheric propagation of signals from distant stations of all services of the United States and other countries operating on frequencies in this band; and that no protection from such harmful interference generally can be expected. Persons desiring to avoid such harmful interference should consider operation on available frequencies higher in

the radio spectrum not generally subject to this type of difficulty. Ref. 10.101 (g), 11.8 (h), and 16.8 (e) respectively.

8. It should be noted that the few instances in which it was deemed necessary to move a portion of a service to an adjacent frequency to avoid interspersion present a special problem. It is reasonable to allow existing users on these affected frequencies to continue to operate for some period of time. To impose an imminent date for these licensees to change frequencies because of this proposed re-allocation appears to be unduly onerous. On the other hand, to permit such operation indefinitely would preclude potential new users from establishing systems on frequencies made available to them under this proposed re-allocation. The Commission specifically invites comments on this problem as an aid in determining an optimum cut-off date.

9. Attention is directed to the proposal to allocate 10 kc/s segment contiguous to the Government band in the form of two 5 kc/s segments to the service adjacent to this band. Similar segments have been created contiguous to one frequency band now available to the Domestic Public Radio Service, and it has been proposed to allocate these to the adjacent Industrial Radio Service. It should be noted that segments of like size could be created contiguous to Government bands in the 42-50 Mc/s band. While this Notice contains no specific proposal with reference thereto, comments are invited as to the desirability of establishing such segments.

10. Authority for the proposed amendments is contained in Sections 4 (i) and 303 of the Communications Act of 1934, as amended.

11. Pursuant to applicable procedures set forth in Section 1.213 of the Commission's Rules, interested persons may file comments on or before May 1, 1962, and reply comments on or before May 11, 1962. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. In reaching its decision in this proceeding, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this Notice.

12. In accordance with the provisions of Section 1.54 of the Commission's Rules and Regulations, an original and fourteen copies of all statements, briefs, and comments filed should be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION
Ben F. Waple
Acting Secretary

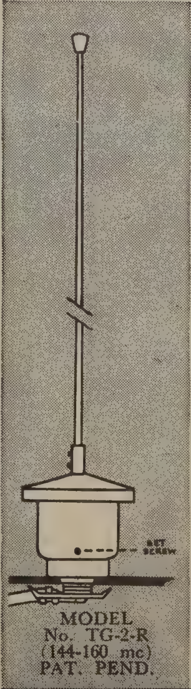
Mc/s	Present Alloc.	Proposed Alloc.
30.56) to) 30.565)	5 kc/s	Indus. Dev.
30.565) to) 30.57)	5 kc/s	Indus. Dev.
30.58	Spec. Indus., Perm.	Spec. Indus., Perm.
30.60	*	do
30.62	Spec. Indus., Perm.	do
30.64	*	do
30.66	Petro., Urb. Psngr.	Spec. Indus., Gen.
30.68	*	Spec. Indus., Perm.
30.70	Petro., Urb. Psngr.	do
30.72	*	do
30.74	Petro., Urb. Psngr.	do
30.76	*	do
30.78	Petro., Urb. Psngr.	do
30.80	*	do
30.82	Petro., Urb. Psngr.	do
30.84	*	Bus., Gen.
30.86	For. Cons., Urb. Psngr.	Bus., Perm.
30.88	*	do
30.90	For. Cons., Urb. Psngr.	Bus., Gen.
30.92	*	Bus., Perm.
30.94	For. Cons., Urb. Psngr.	Bus., Gen.
30.96	*	Bus., Perm.
30.98	For. Cons., Urb. Psngr.	Bus., Gen.
31.00	*	Bus., Perm.
31.02	For. Cons., Urb. Psngr.	Bus., Itin.
31.04	*	Bus., Perm.
31.06	For. Cons., Urb. Psngr.	Bus., Itin.
31.08	*	Bus., Perm.
31.10	For. Cons., Urb. Psngr.	Bus., Gen.
31.12	*	Bus., Perm.
31.14	For. Cons., Urb. Psngr.	Bus., Itin.
31.16	*	Bus., Gen.
31.18	For. Cons.	For. Cons.
31.20	*	do
31.22	For. Cons.	do
31.24	*	do
31.26	For. Cons.	do
31.28	*	do
31.30	For. Cons.	do
31.32	*	For. Cons.
31.34	For. Cons.	do
31.36	*	do
31.38	For. Cons.	do
31.40	*	do
31.42	For. Cons.	do
31.44	*	do
31.46	For. Cons.	For. Cons.
31.48	*	do
31.50	For. Cons.	do
31.52	*	do
31.54	For. Cons.	do
31.56	*	do
31.58	For. Cons.	do
31.60	*	do
31.62	For. Cons.	do
31.64	*	Loc. Govt.
31.66	For. Cons.	do
31.68	*	do
31.70	For. Cons.	do
31.72	*	do
31.74	For. Cons.	do
31.76	*	do
31.78	For. Cons.	do
31.80	*	do
31.82	For. Cons.	do
31.84	*	do
31.86	For. Cons.	do
31.88	*	do
31.90	For. Cons.	do
31.92	*	do
31.94	For. Cons.	Loc. Govt.
31.96	*	do
31.98	For. Cons.	do
31.99) to) 31.995)	5 kc/s	Pub. Safety, Dev.
31.995) to) 32.00)	5 kc/s	Pub. Safety, Dev.

* * * * *

Mc/s	Present Alloc.	Proposed Alloc.
33.00) to) 33.005)	5 kc/s	Land Transp., Dev.
33.005) to) 33.010)	5 kc/s	Land Transp., Dev.
33.02	Hwy. Mnt/Sp. Emerg.	Hwy. Maint/Sp. Emerg.
33.04	*	do
33.06	Hwy. Mnt/Sp. Emerg.	do
33.08	*	do
33.10	Hwy. Mnt/Sp. Emerg.	do
33.12	*	Spec. Indus. Gen.
33.14	Bus. Gen., 3 w	Bus., Gen.
33.16	*	Bus., Gen.
33.18	Petroleum	Petroleum
33.20	*	do
33.22	Petroleum	do
33.24	*	Petroleum
33.26	Petroleum	do
33.28	*	do
33.30	Petroleum	do
33.32	*	do
33.34	Petroleum	do
33.36	*	do
33.38	Petroleum	do
33.40	*	Bus. Gen.
33.42	Fire	Spec. Indus.
33.44	*	Spec. Indus., Perm.
33.46	Fire	Spec. Indus., Gen.
33.48	*	Spec. Indus., Perm.
33.50	Fire	do
33.52	*	Bus., Perm.
33.54	Fire	Bus., Gen.
33.56	*	Bus., Perm.
33.58	Fire	Bus., Gen.
33.60	*	Bus., Perm.
33.62	Fire	Bus., Itin.
33.64	*	Bus., Perm.
33.66	Fire	Bus., Gen.
33.68	*	Bus., Gen.
33.70	Fire	Fire
33.72	*	do
33.74	Fire	do
33.76	*	do
33.78	Fire	do
33.80	*	do
33.82	Fire	do
33.84	*	do
33.86	Fire	do
33.88	*	do
33.90	Fire	do
33.92	*	do
33.94	Fire	do
33.96	*	do
33.98	Fire	do
33.99) to) 33.995)	5 kc/s	Pub. Safety, Dev.
33.995) to) 34.00)	5 kc/s	Pub. Safety, Dev.
	* * * * *	
35.00) to) 35.005)	5 kc/s	Indus., Dev.
35.005) to) 35.01)	5 kc/s	Indus., Dev.
35.02	Bus., Gen. 3 w	Bus., Gen. 3 w
35.04	Bus., Gen. 180 w	Bus., Gen. 180 w
35.06	Bus., Perm. 180 w	Bus., Perm. 180 w
35.08	do	do
35.10	do	do
35.12	do	do
35.14	do	do
35.16	Tel. Maint., Base and Mobile	Tel. Maint., Base and Mobile
35.18	Bus., Perm. 180 w	Bus., Perm. 180 w
35.19) to) 35.195)	5 kc/s	Indus. Dev.
35.195) to) 35.20)	5 kc/s	Indus. Dev.
	* * * * *	
35.68) to) 35.685)	5 kc/s	Indus. Dev.
35.685) to) 35.69)	5 kc/s	Indus. Dev.
35.70	Bus., Perm.	Bus., Perm.
35.72	do	do
35.74	Spec. Indus. Perm.	Spec. Indus., Perm.
35.76	do	do
35.78	do	do
35.80	do	do
35.82	do	do
35.84	Spec. Indus., Perm.	Spec. Indus., Perm.
35.86	do	do
35.88	Bus., Perm. 180 w	Bus., Perm. 180 w
35.90	do	do
35.92	do	do
35.94	Bus., Gen.	Bus., Gen.
35.96	do	do
35.98	do	do
35.99) to) 35.995)	5 kc/s	Indus., Dev.
35.995) to) 36.00)	5 kc/s	Indus., Dev.
	* * * * *	
37.00) to) 37.005)	5 kc/s	Indus., Dev.
37.005) to) 37.01)	5 kc/s	Indus., Dev.
37.02	Police	Spec. Indus., Perm.
37.04	*	Spec. Indus., Gen.
37.06	Police	Spec. Indus., Perm.
37.08	*	Spec. Indus., Itin.
37.10	Police	Spec. Indus., Perm.
37.12	*	Spec. Indus., Itin.
37.14	Police	Spec. Indus. Gen.
37.16	*	Spec. Indus., Itin.
37.18	Police	Spec. Indus., Perm.
37.20	*	Spec. Indus., Itin.
37.22	Police	Spec. Indus., Gen.
37.24	*	Spec. Indus., Itin.
37.26	Police	Spec. Indus., Perm.
37.28	*	Spec. Indus., Itin.
37.30	Police	Bus., Gen.
37.32	*	Bus., Perm.
37.34	Police	Bus., Gen.
37.36	*	Bus., Perm.
37.38	Police	Bus., Gen.
37.40	*	Bus., Perm.

Mc/s	Present Alloc.	Proposed Alloc.
37.42	Police	Bus., Itin.
37.44	*	Relay Press
37.46	Power	Power 1/
37.48	*	do 1/
37.50	Power	do 1/
37.52	*	do 1/
37.54	Power	do
37.56	*	do
37.58	Power	do
37.60	*	do
37.62	Power	do
37.64	*	do
37.66	Power	do
37.68	*	do
37.70	Power	do
37.72	*	do
37.74	Power	do
37.76	*	do
37.78	Power	do
37.80	*	do
37.82	Power	do
37.84	*	do
37.86	Power	do
37.88	*	Relay Press
37.90	Hwy. Mnt/Sp. Emerg.	Hwy. Maint/Sp. Emerg.
37.92	*	do
37.94	Hwy. Mnt/Sp. Emerg.	do
37.96	*	do
37.98	Hwy. Mnt/Sp. Emerg.	do
37.99) to) 37.995)	5 kc/s	Pub. Safety, Dev.
37.995) to) 38.00)	5 kc/s	Pub. Safety, Dev.
39.00) to) 39.005)	5 kc/s	Pub. Safety, Dev.
39.005) to) 39.01)	5 kc/s	Pub. Safety, Dev.
39.02	Police	Police
39.04	*	do
39.06	Police	Police 3 w
39.08	*	Police
39.10	Police	do
39.12	*	do
39.14	Police	do
39.16	*	do
39.18	Police	do
39.20	*	do
39.22	Police	do
39.24	*	do
39.26	Police	do
39.28	*	do
39.30	Police	do
39.32	*	do
39.34	Police	do
39.36	*	do
39.38	Police	do
39.40		do
39.42	Police	do
39.44	*	do
39.46	Police, Intersys.	Police, Intersys.
39.48	*	Police
39.50	Police	Police
39.52	*	do
39.54	Police	do
39.56	*	do
39.58	Police	do
39.60	*	do
39.62	Police	do
39.64	*	do
39.66	Police	do
39.68	*	do
39.70	Police	do
39.72	*	do
39.74	Police	Local Govt.
39.76	*	do
39.78	Police	do
39.80	*	do
39.82	Police	do
39.84	*	do
39.86	Police	do
39.88	*	do
39.90	Police	do
39.92	*	do
39.94	Police	do
39.96	*	do
39.98	Police	do
39.99) to) 39.995)	5 kc/s	Pub. Safety, Dev.
39.995) to) 40.00)	5 kc/s	Pub. Safety, Dev.
42.00) to) 42.005)	5 kc/s	Pub. Safety, Dev.
42.005) to) 42.01)	5 kc/s	Pub. Safety, Dev.

1/ Available also to Forest Products in the States of Oregon & Washington only.



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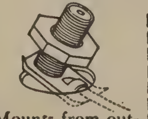

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OUR MAN IN WASHINGTON

Manager of Communication Horizons' Washington Office, Robert E. Tall, reports on the past month's communication activities

FCC FILING FEE PLAN

Most controversial issue of the month was the split-decision adoption of a plan for charging filing fees by the FCC. Elsewhere in this issue you will find the full story; however, here is the notice of proposed rule making as adopted:

DOCKET NO. 14507
NOTICE OF PROPOSED RULE MAKING

Notice is hereby given of rule-making in the above-entitled matter.

In the provisions of the Independent Offices Appropriation Act of 1952, (5 U.S.C., Sec. 140), set out in Appendix A hereto, Congress has stated, "that any work, service, publication, report, document, benefit, privilege, authority, use, franchise, license, permit, certificate, registration, or similar thing of value or utility performed, furnished, provided, granted, prepared or issued by any Federal agency . . . . to or for any person . . . . except those engaged in the transaction of official business of the Government, shall be self-sustaining to the full extent possible." In order to bring about the accomplishment of this objective, Section 140 of Title 5 authorizes the head of each agency to prescribe by regulation such fees and charges as he shall determine to be fair and equitable "taking into consideration direct and indirect cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts."

The enabling legislation referred to above also provides that the fees and charges shall be as uniform as practicable and subject to such policies as the President may prescribe. The Bureau of the Budget operating in behalf of the President has issued Circular No. A-25, September 23, 1959, which sets forth general policies for developing an equitable and uniform system of charges for certain Government services and property so as to implement the provisions of the Independent Offices Appropriation Act of 1952.

The Federal Communications Commission, in conducting its regulatory activities, conveys special benefits to identifiable recipients above and beyond those which accrue to the public at large. In fairness to the general taxpayer—who bears the major burden of supporting Federal agencies—the Government has adopted the policy that the recipient of special benefits conveyed by a Federal agency should pay a reasonable charge for the benefits received. In accordance with this policy, the Commission has determined that the public interest would be served by the establishment of a fair and equitable schedule of fees for its licensing and regulatory activities, thereby recouping for the Government a portion of the Commission's cost of regulating the communications industry. The authority for proceeding in this area is clearly outlined in the provisions set forth in Appendix A.

In arriving at the proposed schedule of fees, considerable effort has been directed towards selecting those services provided by the Commission which are readily identifiable and assigning to each a fair and equitable assessment, taking into consideration cost to the Government, value to the recipient, public policy or interest served, and other pertinent facts.

The fees as scheduled below do not differentiate between commercial and noncommercial services. It has been suggested alternatively that non-commercial services such as non-commercial educational FM and TV, the public safety radio services, and the experimental services should be charged either a token fee or should be free of any fee obligation. Comments on this point are specifically requested.

The contemplated fees relate generally to the filing of applications. All filing fees would be payable at the time of filing and would be charged regardless of whether the application is granted, designated for hearing, or otherwise handled. The proposed fee schedules follow:

Proposed Schedule of Fees for Broadcast Services

For Filing Application	Fees AM	Fees FM	Fees TV
For New Station or Major Change	$150	$150	$250
For Renewal or Assignment of License or Transfer of Control *	$150	$150	$250
For Special Call Sign for Broadcast Station	$5		
All Other Applications in Broadcast Service (Including all TV Translator Applications)	$30 for each applic.		

* Excluding pro-forma transactions, on which $30 would be paid under "other applications".

Proposed Schedule of Fees for Safety and Special Radio Services

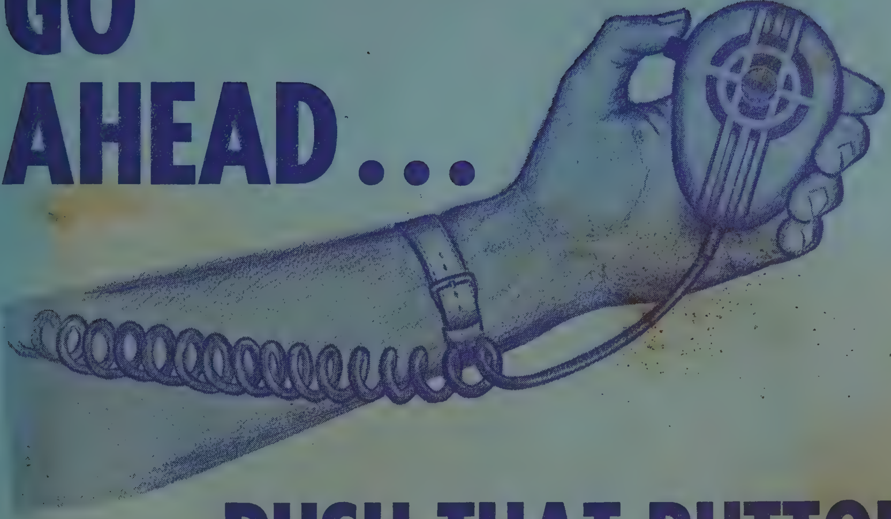
For Filing Application	Fees
For Amateur, RACES and Disaster Radio Services	$ 5
For Citizens Radio Service	10
For All Other Safety and Special Radio Services	20
For Special Amateur Call Sign pursuant to 12.81	5

Proposed Schedule of Fees for Common Carrier Services

For Filing Application	Fees
Applications for Initial Construction Permit (no additional charge for license to cover):	
Domestic Public Land Mobile Radio Service (includes base station and associated mobile units)	$150
Point-to-Point Microwave Radio Service	100
Local Television Transmission Service	50
Rural Radio Service and Domestic Public Land Mobile Radio Service Individual User Units	10
International Fixed Public Radiocommunication Services:	
Additional Transmitter	150
Replacement of Transmitter	50
Other Common Carrier Services	10
Applications for Renewal of License:	
Domestic Public Land Mobile Radio Service (includes base station and associated mobile units)	75
Point-to-Point Microwave Radio Service	50
Local Television Transmission Service	25
Rural Radio Service and Domestic Public Land Mobile Radio Service Individual User Units	5
International Fixed Public Radiocommunication Services	75
Other Common Carrier Services	5
All other common carrier radio applications	10
Section 214 applications by telephone companies	100
Section 214 applications by telegraph companies	25
Cable Landing License applications	250
Section 221 applications	50
Interlocking Directorate applications	10
All other common carrier non-radio applications	10

(Continued on page 24)

GO AHEAD...



PUSH THAT BUTTON!

NOW — were you satisfied with the chain of events that followed? When you press your microphone button, do you command all of the communications range and coverage that you need?

In Short—

Are you satisfied with the service you get day-in and day-out with your two-way communications system?

Many phases of present day two-way communications are ham-strung by 1940-ish frequency allocations, operating techniques and engineering. **But** — the face of two-way radio is changing fast, daily, and the year ahead promises to show more concrete progress than any year in the past.

To keep your world of two-way radio informed, current and progressive, Communication Horizons reports to you monthly within these pages on the important technical developments, FCC actions, systems engineering and new products that **you need to know about** to keep your communications system performing at peak efficiency.

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........15 issues of Communication Horizons at the special price of $4.00. **I am mailing this form before April 8, 1962.**

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........12 issues of Communication Horizons, $4.00. **I am mailing this form after April 20, 1962.**

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Radio Call Sign..

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City/Town.. **Zone**........ **State**....................

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Modesto, California

In The May Communication Horizons

AFTER CONELRAD, WHAT?

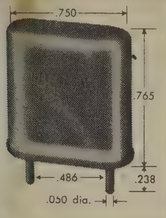
It's no secret that a change in CONELRAD is imminent; our Washington bureau will tell you what you can expect the change to be.

DON'T MISS THIS INSIDE REPORT

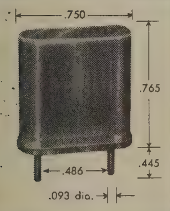
by Robert E. Tall

plus many other up-to-the-minute features . . . . in May.

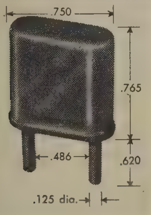
Custom made CRYSTALS



F-605



F-609



F-612

FREQUENCIES 70 KC TO 137 MC

DESCRIPTION AND DATA:

All of these crystals are of the plated, wire-mounted type. Low drift AT-cut blanks are used in these units above 500 KC, and low drift DT and CT-cut blanks are used in units below 500 KC; any crystal can be supplied for operation with or without an oven.

TEMPERATURE TOLERANCE:
AT—±.005% from —55° to +90°C.
±.002% from —30° to +60°C.
DT-CT—±.01% from —40° to +70°C.

CALIBRATION TOLERANCE:
Supplied to meet equipment manufacturers speifications and may be as close as .001% without oven or .0005% with oven. Where no equipment is specified the following will apply.
AT— .0025% of nominal at +30°C.
DT-CT— .01% of nominal at +30°C.

DRIVE LEVELS:
Maximum, AT—
10 milliwatts 500 KC to 999 KC
4 milliwatts 10,000 KC to 24,000 KC
2 milliwatts 25 MC to 137 MC
DT-CT—2 milliwatts

CIRCUIT: As specified by customer. Crystals are available for all major two-way equipment and in most cases the necessary correlation data is on file. Where circuit is not specified, the crystal will be calibrated for operation into a load capacitance of 32 mmf.

FREQUENCY RANGES AND MODES OF OPERATION

200-500 KC:
Operates on fundamental edge shear oscillation. Load capacitance 32 mmf . . . or as specified by customer. If load is not known specify circuit or equipment in which crystal will be used.

500-20,000 KC:
Operates on fundamental face shear oscillation. Load capacitance 32 mmf . . . or as specified by customer.

10-60 MC:
Operates on third mechanical overtone at anti-resonance. Will give reasonable output in tuned circuit.

60-100 MC:
Operates on fifth (or seventh) mechanical overtone at series-resonance. Drive level must be kept below 2 milliwatts.

ONE DAY SERVICE

Orders for less than five crystals are shipped within one working day following receipt of order (except low frequency and special crystals which require 10 to 30 days for processing). Orders received on Mon. thru Thurs. will be shipped the day following. Orders received on Fri. will be shipped the following Mon. Postage is prepaid within continental U.S. when cash accompanies order. All others are shipped F.O.B. Oklahoma City.

SUPPLY THIS INFORMATION WHEN ORDERING

MOTOROLA: Crystals can only be properly correlated for Motorola equipment if the crystal type number is given. Example: D02, R28, D03, etc. In cases where crystals are required for type D-14, 800 and 801 holders, always specify crystal frequency or the high IF frequency. Check whether the crystals are to be used in ovens.

GENERAL ELECTRIC: Specify model number of transmitter and receiver RF Decks. Example: 4ES13A3, 4ER24B1, 4ET5B3, etc. When ordering crystals for 450 MC equipment specify:

Receiver Crystals:
A. If they are heated or non-heated.
B. If the unit is AFC or NON-AFC Controlled.
C. Platter number of present receiver deck.

Transmitter Crystals:
A. If they are heated or non-heated.

R.C.A.: Specify model number of unit or MI Number of the crystal. Always indicate whether crystals are to be non-heated or heated type.

OTHERS: Specify model number of the receiver and transmitter as well as any formulae that pertain to the correct crystal calculation.

PRICES — F-605, F-609, F-612 CRYSTALS

Fundamental KC		Fundamental KC		Overtone MC	
200 - 499*	$12.50	3000 - 3999	$5.75	10 - 34.99	$ 6.50
500 - 849*	15.00	4000 - 5999	5.00	35 - 44.99	7.00
850 - 899*	13.50	6000 - 9499	4.50	45 - 60	8.50
900 - 999*	12.50	9500 - 10999	5.00	61 - 75	10.50
1000 - 1499†	9.80	11000 - 14999	6.30	76 - 137	15.00
1500 - 1999†	7.50	15000 - 20000	8.00		
2000 - 2999	6.50				

*Allow 10 to 30 days for processing. †Allow 2 to 3 days for processing.

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Proposed Schedule of Fees for Ship Inspection and Certification

Vessel Inspected	Fees
Based on Certification Under the Communications Act:	
Title III Part II (Passenger)	$ 50
Title III Part II (Cargo)	40
Title III Part II (500-1600 gross tons)	20
Title III Part III	10
Based on Certification under Great Lakes Agreement.	20

Proposed Schedule of Fees for Experimental Services

For Filing Application	Fees
All Experimental Services	$ 20

Proposed Schedule of Fees for Commercial Operator Examinations and Licensing

Function	Fees
Commercial Operator Examinations	
First Class	$ 5
Second Class	4
Third Class	3
Commercial Operator License Applications (includes renewals, endorsements, duplicates, etc.)	2
Restricted Radiotelephone permits	2

Authority for the adoption of the amendments herein proposed is contained in Section 4(i) of the Communications Act, Section 140 of Title 5 of the United States Code, and Budget Bureau Circular A-25 (September 23, 1959).

Pursuant to applicable procedures set forth in Section 1.213 of the Commission's rules, interested persons may file comments on or before April 16, 1962, and reply comments on or before May 16, 1962. All relevant and timely comments and reply comments will be considered by the Commission before final action is taken in this proceeding. in reaching its decision on the rules of general applicability which are proposed herein, the Commission may also take into account other relevant information before it, in addition to the specific comments invited by this notice.

In accordance with the provisions of Section 1.54 of the Commission's rules and regulations, an original and 14 copies of all statements, briefs, or comments shall be furnished the Commission.

FEDERAL COMMUNICATIONS COMMISSION *
Ben F. Waple
Acting Secretary

Attachment: Appendix A
Adopted: February 14, 1962
Released: February 16, 1962

* See attached Dissenting Statement of Commissioner Bartley.
* Commissioners Ford and Cross dissenting.

DISSENTING STATEMENT OF COMMISSIONER BARTLEY

While I can accept the concept that user charges, endorsed by Congress in the Independent Offices Appropriation Act of 1952, is desirable for the types of special benefits conferred by some Federal agencies, I am of the opinion that fees for services of this Commission in regulating communications by wire and radio are incompatible with certain basic principles of the Communications Act of 1934, as amended.

Regulation of communications is for the benefit of the public and not for the benefit of the industry which is regulated.

Licenses may be issued by the Commission for fixed periods only upon a finding that the public interest, convenience and necessity would be served thereby. Thus, the primary beneficiary of our licensing activities is intended to be the general public. Although a license issued by this Commission may have considerable economic value to the licensee, use under the license is always subservient to the public interest.

Licenses issued by the Commission are for use only of a frequency and confer no ownership rights therein. Charging fees for licenses may well create here a contention of ownership or proprietary right inherent in other types of license fee payments.

The Commission is charged with the responsibility of promoting maximum effectiveness in the use of wire and radio communication for service to the people of the United States and for the safety of their life and property. The assessment of fees would be a deterrent to effectuation of that purpose by making more difficult our implementation of new uses under Section 303 (g) of the Communications Act of 1934, as amended.

In view of the foregoing, I dissent to the issuance of this proposed rulemaking.

BURGLAR, FIRE SYSTEM

The Commission extended comment deadline to April 15 on its mid-December proposal for revisions in the Police, Fire, and Local Government Service rules to permit operation of intruder and fire alarm systems on a tone or impulse basis. APCO had requested the extension.

Opposition to the proposal has already been filed by the Central Station Electrical Protection Association, the American District Telegraph Co., and the Illinois chapter of APCO. Support for the proposal was filed by the General Electric Communication Products Department, but the GE comments included suggestion that the new rules should include warnings against placing too many such units in a system.

"In the event of certain man-made or natural catastrophes," the GE comment pointed out, "several of these devices might be tripped within a few seconds or minutes of each other. Just when . . . radio is needed for emergency mobile work, the frequency may be fully occupied with warning transmitter signals."

The opposition comments filed have not been objecting to such use of radio, but rather to the possibility that the proposed new rules might enable municipalities to employ public funds to compete with private business. ADT operates silent warning alarm services throughout the country. The Illinois APCO comment suggested that the signalling service be limited to publicly owned property.

WHENCE CONELRAD?

Revision or replacement of CONELRAD, long rumored under consideration, appeared a more real possibility this month. FCC Commissioner Robert T. Bartley said a government report concerning "a new civil defense communications system" is "imminent," but added that he was "not at liberty to discuss it."

Paul Fisher, deputy assistant defense secretary for civil defense, said the "vital" need is for means of preserving a communications system to operate after attack.

Earlier, Washington newspapers had headlined articles that CONELRAD would soon be scrapped. The reason given in these articles was Air Force feeling that the main threat of attack now is from missiles, which cannot make use of homing radio signals, rather than from manned aircraft.

CHANNEL SWITCH OK ASKED

The International Association of Chiefs of Police has asked the FCC for a rule change to allow any "regularly authorized" police radio system to change channels instantly on an intermittent basis.

Chief Fred E. Castenholz, of Muskegon, Mich., who heads the IACP communications committee, made the request in a letter to FCC Chairman Minow. Chief Castenholz said IACP has asked APCO to prepare and file with the commission an appropriate petition.

Object of the requested rule change is to allow police to outwit criminal-operated "monitor stations" by switching to any other channel authorized for police use. A requested condition of the rule would be that any department making use of the channel switch not cause interference to a police department regularly authorized to use that frequency.

NEW SERVICE ASKED

Establishment of a new "Industrial Protection Radio Service" in the 450-470 mc band (see item below) has been requested by Pinkerton's National Detective Agency, Inc., in a petition to the FCC.

Pinkerton's recalled that the Commission had earlier proposed to set up such a service to provide for mobile radio communications in connection with protection activities rendered by security organizations to business concerns, and to allocate 10 pairs of frequencies between 461 and 467 mc to the service.

Under the old FCC proposal, five of the pairs would come from existing business radio service assignments, and the other five would be produced by channel splitting.

The detective agency noted that the only radio frequencies now available for such security organizations are in the citizens and business radio services, and noted that "in many areas" the saturation of these frequencies has precluded proper usage by security organizations.

The petition urged the allocation of the five "primary" pairs suggested in the earlier commission action, and an additional five "primary" pairs from either the citizens or business services. Additional pairs would be requested when channels are split.

450-470 MC PROPOSALS

The 450-470 mc rule proposals made late in 1960 will probably be split into a number of separate rule proceedings to effect earlier resolution of some of the problems, FCC officials told SIRSA members recently.

When issued, the proposals looked toward requiring a reduction in the FM deviation in this band from 15 kc to 5 kc; toward reducing the channel separation from 50 to 25 kc; toward reallocating certain portions of the band between 460 and 470 mc; toward prohibiting the use of these frequencies by any class of fixed station other than a control station for secondary control of a mobile relay station; and toward reserving 20 frequency pairs in the band for two new radio services.

A flood of opposing comments appeared to scuttle any overall single action, and has apparently led to the current plan to tackle the problems on a more-individual basis.

RULE ARGUMENT DUE

A request by the state of Colorado for a rule waiver concerning permissible communications in the police radio service will be disposed of through oral argument, the FCC ruled. Place, date, and time of the argument will be specified in a later order.

Colorado officials had requested the waiver to allow continuation of their "integrated statewide radio service" which handles governmental communications other than police matters.

The Commission ordered the state to file a written notice of its intention to appear and take part in the argument within 20 days, and called for any other police communications organizations desiring to participate to file such notice within the same period.

UMPTEEN!

Yes, no matter what your communications antenna requirements are... Mosley makes UMPTEEN types to fill your needs in the 2 MC. to 470 MC. range.

360° ground plane • cardioid ground plane • figure eight ground plane • single frequency yagi beams • multi-frequency yagi beams • single frequency verticals • multi-frequency verticals • VEE antennas • rhombic antennas

You are cordially invited to submit your antenna requirements to our creative engineering staff. Prompt evaluations and proposals will be made along with price quotations and delivery commitments. Address your request to Dept. CH22... today.

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LOGBOOK

A handy calendar of important meetings and events of interest to mobile communications*

March 26—Washington (D.C.) Chapter Meeting of IRE PGVC.

March 26-29—International Radio and Electronics Show and IRE International Convention. Waldorf-Astoria Hotel and New York Coliseum, New York City.

March 30—Comments due on FCC proposal to expand eligibility in auto emergency radio services to include any person engaged in providing any form of emergency road service to public, whether or not applicant operates a public garage.

April 2—Comment deadline on FCC proposal to withdraw seven 153 and 158 mc frequencies, from petroleum and forest prducts services in Oregon and Washingon and allocate them to power service there.

April 6—Meeting of representatives of Associated Public Safety Communication Officers, Forestry Conservation Communications Association, International Municipal Signal Association, and American Association of State Highway Officials in cooperative approach to public safety radio problems.

April 10-11—Annual Meeting of Petroleum Industry Electrical Association, Dallas, Tex.

April 11—Virginia Chapter Meeting of Associated Public-Safety Communication Officers. Virginian Hotel, Lynchburg.

April 11-15—Comment deadline on FCC proposal to permit the operation of low powered transmitters on frequencies in the police, fire and local government radio services for intruder or fire alarm purposes.

April 16—Comment deadline on FCC proposal to charge "filing fees" for applications submitted to Commission.

April 30—Washington (D.C.) IRE PGVC.

May 1—Comments due on FCC proposals to service—allocate the new split channels in the 25-42 mc mobile radio band.

May 16—Metropolitan New York Chapter Meeting of IRE Professional Group on Vehicular Communications.

May 16-18—Annual convention of Industrial Communications Association. Sheraton Chicago Hotel. Chicago.

May 18—Los Angeles Chapter Meeting of IRE Professional Group on Vehicular Communications.

May 28—Washington (D.C.) Chapter Meeting of IRE Professional Group of Vehicular Communications.

June 15—Los Angeles Chapter Meeting of IRE PGVC.

June 22—Deadline for reply comments in connection with FCC proposals to foster growth of UHF television, deintermix eight television market areas, and add new VHF TV assignments in eight other markets.

August 7-10—National conference of Associated Public-Safety Communication Officers. Harrison Hotel, Clearwater, Fla.

August 21-24—Western Electronics Show and Convention. Ambassador Hotel and Memorial Sports Arena, Los Angeles.

September 23-26—Annual conference of International Municipal Signal Association. Queen Elizabeth Hotel. Montreal.

March 31, 1963—Licensees in the automotive Emergency service, as of April 1, 1958, may continue to operate on 35.70 mc or 35.98 mc until this date. Such users may, on or before this date, convert to the business radio service without changing frequency, or remain in the auto emergency service by changing frequency.

***If we have omitted a date of importance to the industry, drop CH Washington Bureau Chief Robert E. Tall a line at 1327 F Street N. W., Washington 5, D.C., and we will try to include it next month.**

CH SHOWCASE

NEW PRODUCTS IN THE PROFESSIONAL COMMUNICATIONS FIELD

TRANSISTORIZED TRANSCEIVER

Miniquip, Inc., has announced a fully transistorized two-way unit smaller than a cigar box and weighing less than 2 pounds, for use in all standard NBFM systems.

Available for any frequency between 30 and 170 mc., the "Hi-Band 26" unit features high receiver sensitivity and unusual transmitter power for its size. Three-tenths of a microvolt will open the squelch, while a half microvolt produces 20 db quieting. Power output ranges from 1 watt at 40 mc to a minimum of 300 mw at 150 mc.

Rechargeable nicad batteries operate the 25-ounce unit. Operating time between recharges is between 8 hours (for heavy use) and 30 hours (for extra-light, receiving only, use) and battery life is estimated at 5 years. Charger and cables for use with either 12-volt auto systems or 110-volt line power are standard equipment.

Tone paging and noise suppression systems are to be made available, says the manufacturer. Complete technical data including schematics are available from Miniquip, Inc., P.O. Box 5428, Reno, Nevada.

ANTENNA LOCATOR

Decibel Products, Inc., Dallas, Texas, manufacturers of antennas, transmission lines, and accessories, has announced availability of an improved version of their "Measuring Stick." The device is designed to simplify the task of plotting the latitude and longitude of station antenna locations, and comes in a slip case with instructions. To get it, send 50 cents for handling and postage to Decibel Products, Inc., 3184 Quebec, Dallas 7, Texas, and tell them you saw it in CH.

CATALOGS, DATA, BULLETINS

A 48-page catalog of Industrial Instruments Inc. equipment for insulation testing, general instrumentation, and automatic production testing. Listed for the first time are standard automatic units. Other products include megohmmeters, decade attenuators, arc-resistance testers, Wheatstone bridges, and voltage breakdown testers. Write Industrial Instruments Inc., 89 commerce Road, Cedar Grove, Essex County, N. J., and ask for catalog no. 25.

Techniques for pressurizing Spir-O-line coaxial cables and Rigid '800' transmission line systems are described in a four-page fully illustrated technical bulletin published by Prodelin, Inc. Both dry-air and dry-nitrogen techniques are described; recommended procedures for purging moisture and detecting leaks are included. Copies are available from Prodelin, Inc., Hightstown, N. J. Request Bulletin 619.

TRANSISTOR HOLDER

Sealectro Corporation has introduced a new Teflon, grommet-type transistor holder which provides mechanical mounting of the transistor on a metal chassis without the need of a socket.

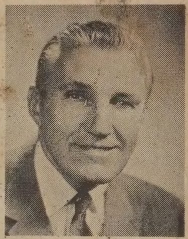
PEOPLE, PLACES *and things*

A Report on Important Personnel, Plant and System Changes During the Past 30 Days

People —

People in the spotlight this month include a new general manager at Gonset, and four additions to the newly announced integrated Communications Department of Du Mont.

At Du Mont—formally Allen B. Du Mont Laboratories Divisions of Fairchild Camera and Instrument Corporation—department manager James R. Mann announced appointment of an FCC coordinator, a "national bid administrator", and two district sales managers.



Twomey

In charge of FCC liaision for the firm will be Robert M. Long, formerly national manufacturers' representative administrator at the RCA Telecommunications Center, and who was active in two-way sales for more than seven years with Bendix Radio in Baltimore.

Responsible for the preparation of municipal, police, fire, and other government and large-industrial-installation bids will be Arthur B. Langton. Formerly a bid administrator in the Communications Department of RCA, Langton will manage the new Du Mont Bid department.

District Sales Manager for the Atlanta, Ga., area is Robert E. Wingate, who came to Du Mont from the presidency of Southern Communication Specialist Co., Inc., in Atlanta.

In charge of the Minneapolis district sales will be Vincent J. Bauer, former RCA Communications Department district sales chief in Pittsburgh.

While the appointments at Du Mont reflect establishment of a new organization, the naming of Fred A. Twomey as general manager of the Gonset Division of Young Spring & Wire Corporation was announced as part of "a major executive realignment."

Formerly with the industrial products division of IT&T, Twomey declared immediate intention to launch an all out marketing effort at Gonset, based on new products and a broadening of present product lines.

Places —

Places highlighted in March were mostly new sales offices.

Hyer Electronics Co., OEM sales representative for Aerovox Corporation, announced the opening of a new branch office in Salt Lake City. Manager of the new office is Virgil Van Deventer. Hyer's main sales office remains in Englewood, Colo.

A new district sales office serving the state of Kentucky was established by General Electric, in Lexington. Robert N. Pugh was named manager.

Things —

General Electric also made news in New Jersey, winning a contract from the New Jersey Turnpike Authority to supply 130 transistorized two-way units for a modernization program.

The system marks the first large-scale use of transistorized equipment on the Turnpike; all units will feature two-frequency transmission and coded squelch.

NEW
quality, economy, distinction,
in UHF radio... **by KAAR**

Kaar TR 505 and TR506 radiotelephones **belong** in Business, Manufacturer, and Class "A" Citizen radio services. For you, Kaar "quality engineers" and Walter Landor's award-winning design staff have created these "best buys" in the UHF, 450-470 mc field. The TR505 (5½" x 13" x 14½") is a completely self-contained unit for either base station or dash-mounted, mobile use. The TR506 Control Head with Combined Speaker (2⅜" x 6½" x 6⅞") is dash-mounted and functions through its trunk-mounted transmitter-receiver. These units feature: Lowest price in their field / Highly stable "IF" Filter using advanced design techniques / Carbon or Dynamic Microphone / Transistorized (6v DC, 12v DC) or 117v AC power supply / Transmitter and Receiver Crystals in temperature-controlled oven / Minimum battery drain and replacement costs / Highly efficient Amperex #7377 Final Amplifier with 9-10 watts of output power / Or, optional #8298 RF Amplifier offering 30-35 watts / TR507 Repeater for extended line-of-sight range / From the most complete line of two-way, UHF equipment in the 450-470 mc field, let Kaar engineers meet your needs... exactly. For complete details, write

KAAR ENGINEERING CORPORATION
2[illegible]5 *Middlefield Road • Palo Alto, California*
WINNER OF WESCON AND ALCOA DESIGN AWARDS

WESCON
IDA 1961

Power on Demand

with these

HY-G… …OMMERCIAL ANTENN… …YSTEMS

…STATION ANTENNAS

6.1 db gain stacked jaypole

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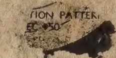

…¼-wave ground plane

…nd plane, Model GP-150 uses dr… …dance matching and to maximi… angle radiation. It is built to commercial duty stan… but co…stru…ted of light weight aluminum, iridit…

…AVAIL…BLE …N
A complete line of low band and 4… mc Band antenna systems.

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